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NEW SPECIES OF *CHARON* (AMBLYPYGI, CHARONTIDAE) FROM NORTHERN AUSTRALIA AND CHRISTMAS ISLAND

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ABSTRACT. Three new species of the genus *Charon* Karsch 1879 are described: *Charon oenpelli* from humid sandstone caves in the Northern Territory, *Charon trebax* from an epigean locality in north Queensland, and *C. gervaisi* from Christmas Island, an Australian territory situated in the Indian Ocean. The status of species formerly attributed to the genus and currently synonymized with the type species *C. grayi* is discussed.

The amblypygid genus *Charon* was first recognized by Karsch (1879) who included a single species from the Philippines, *Phrynus grayi* Gervais 1842, the holotype of which is lodged in the Museum of Natural History, London (Butler 1873). The meager descriptions presented by Gervais (1842, 1844) have since been supplemented by illustrations of the chelicera (Butler 1873), pedipalps (Kraepelin 1895, 1899; Quintero 1986; Weygoldt 1996) and legs (Kraepelin 1899). Seven further species have been added to the genus, but two of these have been subsequently transferred to other genera: *Charon sarawakensis* Thorell 1888 was included in the newly erected genus *Sarax* by Simon (1892), along with the type species *S. brachydactylus* Simon 1892; and *Charon cavernicola* Thorell 1889, was designated the type species of *Stygophrynus* Kraepelin 1895.

Karsch (1880) interpreted the description of *Phrynus medius* (Herbst 1797) (now *Damon medius*) by Hoeven (1842) as representing a separate species, which he named *Charon hoeveni* Karsch. Hoeven's description is relatively good and appears to represent a valid species of *Charon*. Thorell (1888) added three further species based on material collected from Ambon, Indonesia (*C. beccarii* Thorell 1888 and *C. subterraneus* Thorell 1888) and New Guinea (*C. papuanus* Thorell 1888), which were supplemented by extensive and detailed descriptions. *Charon annulipes* Lauterer 1895 was described from Brisbane, Queensland. This species is now considered a *nomen dubium* (Harvey 1985), as the type is presumed lost, the original description is woeful, and no further specimens have been collected in Brisbane or any other portion of southeastern Queensland (Monteith 1965). We feel that its true identity will never be known.

Kraepelin (1895, 1899) subsequently synonymized *Charon hoeveni, C. beccarii, C. subterraneus* and *C. papuanus* under the single name *C. grayi,* and presented an illustrated redescription based upon 51 specimens from 22 different localities ranging from Malaysia to the Solomon Islands, noting significant differences which he ascribed to intraspecific variation. As discussed in detail below, we feel that Kraepelin's decision was flawed and that many of these names will be shown to be valid. Kraepelin's polytypic species concept was applied to other amblypygid genera which subsequent authors have rejected as a gross over-simplification of species-level taxonomy in these groups (Gravely 1915; Mullinex 1975; Quintero 1981).

The recent discovery of specimens of *Charon* from sandstone caves in the Northern Territory (Webber 1992) and from epigean localities in northern Queensland and Christmas Island are the first definitive records of the genus from Australia. These three species are formally described here.

METHODS

The specimens examined during the course of this study are lodged in the following institutions: Natural History Museum, London (BMNH), Museum of Tropical Queensland,

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Townsville (MTQ), Museum and Art Gallery of the Northern Territory, Darwin (NTM), Queensland Museum, Brisbane (QM), Swedish Museum of Natural History, Stockholm (SMNH) and Western Australian Museum, Perth (WAM).

Morphological terminology basically follows Quintero (1981) and Weygoldt (1996), except for the pedipalp segments which follow Snodgrass (1948), Shear et al. (1987), Shultz (1989) and Harvey (1992). The six pedipalpal segments are here named (with Quintero's divergent names in parentheses): coxa, trochanter, femur, patella (tibia), tibia (basitarsus) and tarsus. The tarsus is further divided in some amblypygids. The seven basic leg segments (Shultz 1989; Quintero 1981; Weygoldt 1996) are termed: coxa, trochanter, femur, patella, tibia, metatarsus (basitarsus) and tarsus. The first leg is modified into an antenniform appendage, in which the tibia and tarsus are greatly subdivided. Tibiae II-IV are subdivided into a basitibia and distitibia, of which the former is often further divided. Tarsi II-IV are also subdivided.

The female genitalia were examined after clearing in 50% lactic acid at room temperature before viewing under a compound microscope.

Genus *Charon* Karsch

Charon Karsch 1879: 197; Simon, 1892: 47–48; Kraepelin 1895: 41–42; Kraepelin 1899: 247; Gravely 1915: 446; Mello-Leitão 1931: 52 (type species by original designation *Phrynus grayi* Gervais 1842).

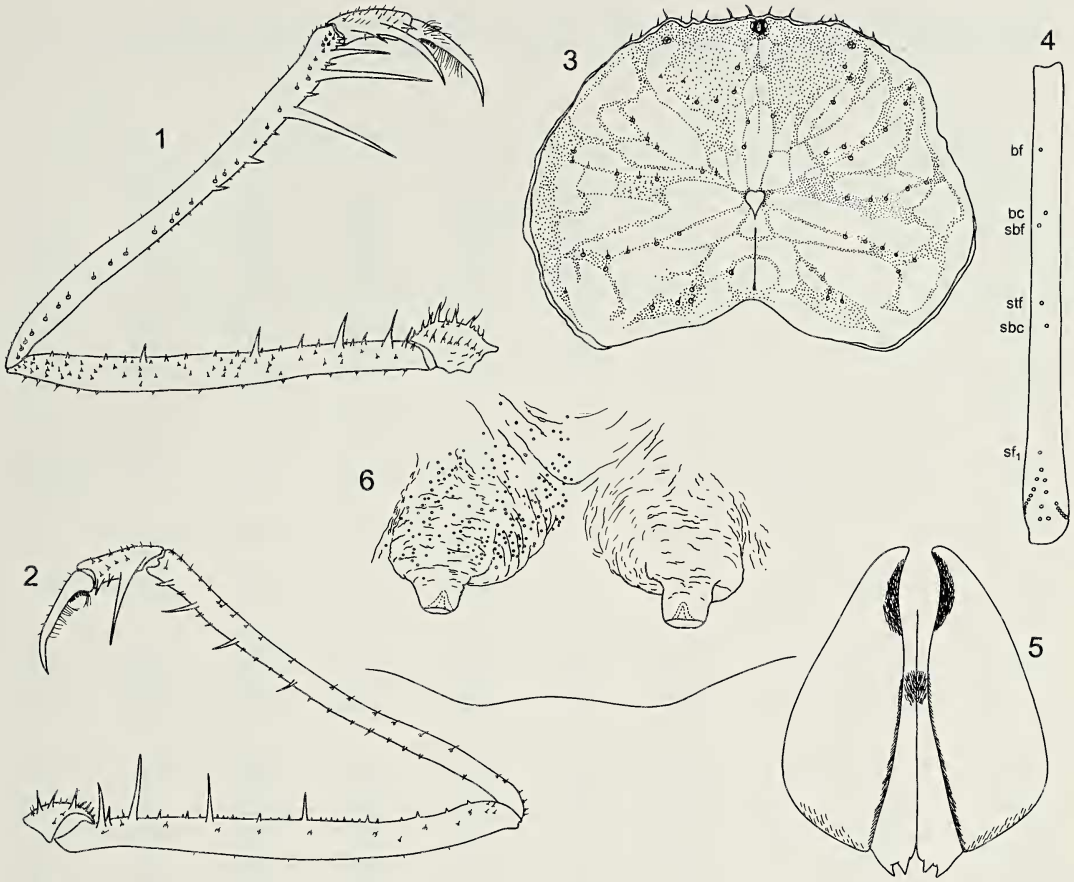
Diagnosis.—The combined presence of pulvillae on tarsi II–IV and an undivided pedipalpal tarsus distinguishes *Charon* from all other amblypygids.

Remarks.—The Charontidae were redefined by Quintero (1986) who included only *Charon* and *Stygophrynus*. The remaining genera formerly placed in the Charontidae (*Catageus* Thorell 1889, *Charinus* Simon 1892, *Paracharon* Hansen 1921, *Phrynichosarax* Gravely 1915, *Sarax* Simon 1892 and *Tricharinus* Quintero 1986) were transferred to the new family Charinidae which was hypothesized to represent the sister-group to the Charontidae. The separation of the two families was supported by Weygoldt (1996) who, as part of a detailed cladistic analysis of the Amblypygi, regarded the Charontidae as the sister-group to the Phrynoidea (Phrynichidae + Phrynidae). *Paracharon* was placed in its own family, Paracharontidae, as the only member of the suborder Paleoamblypygi. *Charon* is the only amblypygid which possesses both tarsal pulvillae and an undivided pedipalpal tarsus (Quintero 1986; Weygoldt 1996).

As discussed above, all previously described species of *Charon* not transferred to other genera or formally designated as *nomina dubia* were synonymized with *C. grayi* by Kraepelin (1895, 1899). In the absence of a full revision of *Charon* in which the status of each name is fully assessed, our decision to describe three new species may seem premature. However, we believe that Kraepelin's decision was categorically incorrect and believe that several quite distinct species exist amongst the material examined by him. Evidence for this comes from the examination of much Indonesian and New Guinean material lodged in WAM, and the holotype male of *C. grayi* lodged in BMNH and a syntype female of *C. beccarii* Thorell lodged in SMNH, none of which is conspecific with any of the species named below. Indeed, the syntype of *C. beccarii* possesses a basitibia III which is clearly subdivided, unlike any other *Charon* species examined by us, which we suspect is evidence of specific status of this species. Whether the apparently sympatric *C. subterraneus* possesses a similar pattern we are not sure. However, we do not formally remove *C. hoeveni, C. beccarii, C. subterraneus* and *C. papuanus* from the synonymy with *C. grayi* until the necessary revisionary work on the southeast Asian fauna has been completed. Our decision to describe the Australian species as new is further based upon their obvious distinctiveness from each other, making it less likely that they are in fact conspecific with any of the names previously proposed in the literature.

Charon oenpelli new species
(Figs. 1–6, 17, 18; Table 1)

Types.—Holotype male from sandstone caves near Oenpelli Reservoir, ca. 9 km S of Oenpelli, Northern Territory, Australia (12°23′58″S, 133°05′09″E), 3 May 1994 (G.R. Brown, P.G. Horner, G. Husband) (NTM). Paratypes: 2♀, same data (NTM); 1♂1♀, same data (WAM 96/1602–1603); 2♀, same data except, 4 October 1993 (D.N. Wilson,



Figures 1–6.—***Charon oenpelli*** new species, male holotype (unless otherwise stated). 1, Left pedipalp, dorsal; 2, Left pedipalp, ventral; 3, Carapace; 4, Left distitibia IV; 5, Male genitalia, dorsal; 6, Female paratype, genitalia, dorsal (pores omitted on one side).

G.A. Husband) (NTM); 2♂, same data except, 30 November 1996 (G.R. Brown) (NTM); 1♂ from sandstone caves near Gunbiyarrmi, near Oenpelli [12°23′18″S, 133°05′09″E, 9 May 1992 (I. Morris) (NTM); 1♂, same data except, 30 August 1992 (J. Webber, I. Morris & G.R. Brown) (NTM).

Other material.--AUSTRALIA: *Northern Territory:* 1 juv. ♂ from sandstone caves near Oenpelli Reservoir, ca. 9 km S of Oenpelli (12°23′58″S, 133°05′09″E), 3 May 1994 (G.R. Brown, P.G. Horner, G. Husband) (NTM); 1♀ (exuvium), 1 juv. ♀, same data except, 17 July 1996 (G. Husband) (NTM).

Etymology.—The specific epithet is a noun in apposition taken from the region from which the species has been collected.

Diagnosis.—*Charon oenpelli* differs from other species of *Charon* by the following combination of characters: basitibia III with 1 segment; basitibia IV with 4 segments; distitibia IV with 26 trichobothria; pedipalps long and slender; eyes reduced in size.

Description.—*Holotype male:* Carapace, pedipalps, leg I and patellae II, III, IV and distitibiae-tarsi II, III, IV all reddish-brown. Tergites and femora II, III, IV more yellowish than carapace. Carapace (Fig. 3): anterior margin straight, with rounded lobe on antero-ventral corners; anterior margin with fine 9 setae between lobes. Sulcus distinct. Median and lateral eyes lightly reduced in size. Median ocular tubercle darker than remainder of carapace, with eyes directed laterally. Carapace with numerous fine tubercles, many with small, acicular setae. Chelicera: hand with 4 teeth on antero-lateral margin, most basal tooth distally incised, 1 proximal tooth on re-

Table 1.—Selection of meristic and spination characters in Australian species of *Charon*.

		Charon oenpelli new species						
		WAM 96/1602 Para-type ♂	NTM Para-type ♂	NTM Holo-type ♂	NTM Para-type ♂	NTM Para-type ♂	NTM Para-type ♂	NTM Juvenile ♂
Carapace	length	5.13	4.69	5.63	4.22	5.00	5.00	3.11
	width	7.50	6.88	8.00	6.06	7.50	7.38	4.26
Median ocular tubercle		0.55	0.48	0.55	0.41	0.50	0.52	0.36
Lateral eyes		2.78	2.48	3.22	2.38	2.81	2.81	1.55
Lateral eye to anterior edge		0.57	0.45	0.48	0.41	0.41	0.48	0.36
Lateral eye to lateral edge		0.43	0.43	0.52	0.31	0.48	0.45	0.29
Genital operculum	length	1.79	1.62	1.67	—	1.90	1.59	0.71
	width	2.74	2.59	3.14	—	3.10	3.15	1.86
Abdomen	length	9.20	8.10	11.60	8.60	8.30	9.00	6.69
	width	5.00	4.88	5.50	4.90	5.30	5.81	3.56
Pedipalp:								
Trochanter	length	2.56	2.07	2.85	1.81	2.20	2.26	1.19
	width	1.56	1.19	1.44	1.19	1.29	1.26	0.81
Femur	length	11.50	8.10	15.10	7.00	10.20	10.50	3.74
	width	1.25	1.07	1.19	0.98	1.20	1.14	0.67
Patella	length	12.56	8.10	15.42	7.38	10.90	11.00	3.44
	width	1.63	0.60	0.88	0.88	0.90	0.83	0.56
Tibia	length	2.80	2.33	3.03	1.92	2.44	2.62	1.41
	width	0.96	0.90	1.00	0.74	0.81	0.83	0.48
Tarsus		3.30	2.70	3.85	2.81	2.70	2.70	1.63
Spines	Trochanter	D6 V8	D5 V8	D6 V7	D6 V5	D6 V6	D6 V6	D5 V10
	Femur	D24 V25	D22 V23	D25 V27	D17 V17	D26 V24	D25 V24	D12 V10
	Patella	D24 V20	D19 V18	D31 V29	D20 V18	D21 V24	D24 V24	D12 V11
	Tibia	D5 V3	D4 V4	D3 V3	D3 V3	D4 V3	D5 V3	D3 V3
Leg I	Femur length	22.90	19.40	24.50	16.85	21.30	20.70	10.90
	Patella length	1.12	1.00	1.10	0.81	0.95	0.95	0.62
	Tibia length	46.11	40.07	50.09	35.46	42.10	43.72	19.34
	Tarsus length	44.52	41.34	48.34	34.82	43.70	42.90	23.00
Leg II	Femur length	12.24	10.40	13.67	9.30	11.45	12.20	6.56
	Patella length	1.50	1.40	1.64	1.28	1.61	1.54	0.95
	Basitibia length	12.72	10.70	13.83	9.20	11.80	12.24	6.38
	Distibia length	5.19	4.60	5.56	4.20	4.80	5.31	3.18
	Metatarsus + tarsus length	3.70	2.31	2.50	2.04	2.40	2.50	1.59

Table 1.—Extended.

							Charon trebax new species	*Charon gervaisi* new species	
NTM Para-type ♀	WAM 96/1603 Para-type ♀	NTM Para-type ♀	NTM Para-type ♀	NTM Para-type ♀	NTM ♀ (exu-vium)	NTM Juvenile ♀	QM S 105078 Holotype ♀	WAM 96/1601 Holotype ♀	QM S17225 Paratype ♀
4.88	5.00	5.80	6.20	5.31	5.70	2.50	4.69	5.30	5.50
7.44	7.09	8.20	8.65	7.50	7.00	3.75	7.19	8.40	8.80
0.48	0.45	0.59	0.56	0.50	0.571	0.30	0.60	0.74	0.77
2.78	2.80	3.11	3.73	2.92	2.59	1.37	2.78	2.89	3.03
0.52	0.56	0.57	0.60	0.50	0.51	0.11	0.48	0.48	0.38
0.48	0.43	0.48	0.64	0.50	0.51	0.22	0.52	0.71	0.95
1.87	1.63	2.10	—	3.18	—	—	—	1.48	—
3.18	3.14	3.49	—	1.88	—	—	—	3.26	—
8.60	8.82	8.60	12.05	9.90	9.50	4.56	11.30	10.90	8.40
5.38	5.29	5.88	7.84	5.79	5.50	2.22	5.80	6.44	6.50
2.09	2.14	2.58	2.67	2.52	2.00	0.89	2.10	2.60	2.26
1.36	1.24	1.38	0.18	1.50	1.30	0.59	1.41	1.48	1.45
8.60	8.10	9.60	12.88	9.60	7.80	2.85	6.40	7.40	8.50
1.26	1.20	1.33	1.40	1.24	1.20	0.55	1.73	1.38	1.56
8.90	9.80	10.40	14.04	10.00	8.10	2.96	7.30	8.30	8.80
0.95	0.93	1.04	1.00	0.95	0.90	0.48	1.07	1.09	1.48
1.74	2.70	3.00	3.83	2.90	2.00	1.11	2.22	2.43	2.59
0.89	0.86	1.06	1.07	1.00	0.80	0.44	0.98	1.00	1.04
3.15		3.40	4.67	3.66	3.20	1.81	2.74	3.11	3.33
D6 V6	D7 V14	D3 V4	D6 V3	D7 V5	D 6 V	D4 V3	D8 V4	D5 V7	D7 V6
D22 V19	D31 V32	D23 V23	D25 V24	D19 V18	D21	D9 V9	D16 V14	D14 V17	D20 V20
D17 V17	D20 V22	D18 V20	D23 V27	D23 V23	D18	D8 V10	D15 V19	D17 V16	D22 V19
D4 V3	D4 V3	D4 V3	D6 V4	D4 V3	D4	D4 V2	D3 V2	D3 V2	D2 V2
19.50	18.90	21.00	24.77	20.50	18.30	8.50	13.04	18.76	17.01
0.93	1.07	1.12	1.07	1.02	0.93	0.60	0.64	1.26	1.07
37.37	36.90	40.08	48.56	41.70	39.75	17.50	21.50	32.90	29.40
36.57	34.30	38.30	45.41	40.50	37.37	18.60	19.70	37.30	34.98
10.90	11.38	11.50	14.05	12.40	10.80	5.50	7.70	10.20	10.30
1.53	1.57	1.50	1.82	1.48	1.40	0.80	1.31	1.56	1.50
10.95	15.30	10.60	14.86	12.40	10.50	4.60	7.25	9.40	9.30
4.78	4.64	5.15	5.59	5.25	4.20	2.50	3.50	4.38	3.90
2.27	2.24	2.35	2.83	2.44	1.60	1.20	2.07	2.60	2.50

Table 1.—Continued

		Charon oenpelli new species						
		WAM 96/1602 Para-type ♂	NTM Para-type ♂	NTM Holo-type ♂	NTM Para-type ♂	NTM Para-type ♂	NTM Para-type ♂	NTM Juvenile ♂
Leg III	Femur length	13.51	11.00	14.31	10.50	12.20	12.58	7.30
	Patella length	1.67	1.43	1.86	1.38	1.75	1.67	1.00
	Basitibia length	15.19	12.56	16.06	11.70	13.99	14.63	7.50
	Distitibia length	5.40	4.70	5.94	4.56	5.20	5.75	3.48
	Metatarsus + tarsus length	2.89	2.44	3.06	2.19	2.50	2.50	1.70
Leg IV	Femur length	12.10	10.10	13.28	9.80	11.10	11.50	6.88
	Patella length	1.57	1.31	1.57	1.19	1.52	1.50	0.90
	Basitibia length	15.42	12.40	15.90	12.00	14.31	14.63	7.55
	Distitibia length	4.63	4.06	4.77	4.00	4.40	4.40	2.96
	Metatarsus + tarsus length	2.69	2.50	2.85	2.50	2.70	2.50	1.85
No. of segments	Tibia I	25	25	25	35	26	26	25
	Metatarsus I	1	1	1	1	1	1	1
	Tarsus I	44	44	44	48	44	33	44
	Basitibia II	1	1	1	1	1	1	1
	Distitibia II	1	1	1	1	1	1	1
	Metatarsus II	1	1	1	1	1	1	1
	Tarsus II	4	4	4	4	4	4	4
	Basitibia III	1	1	1	1	1	1	1
	Distitibia III	1	1	1	1	1	1	1
	Metatarsus III	1	1	1	1	1	1	1
	Tarsus III	4	4	4	4	4	4	4
	Basitibia IV	4	4	4	4	4	4	4
	Distitibia IV	1	1	1	1	1	1	1
	Metatarsus IV	1	1	1	1	1	1	1
	Tarsus IV	4	4	4	4	4	4	4

tro-lateral margin. Movable finger with 6 small basal teeth. Pedipalps (Figs. 1, 2): long and slender (Figs. 17, 18). Trochanter with 6 spines on antero-dorsal margin, 4 spines on antero-ventral margin, and 7 spines on latero-ventral margin. Femur with 4 major spines and 21 smaller spines on antero-dorsal margin; major spine I the longest, with the others decreasing distally (I > II > III > IV); antero-ventral margin with 4 major spines and 23 smaller spines, major spine II the longest, with others arranged II > III > I > IV. Patella with 4 major spines and 27 smaller spines on antero-dorsal margin; major spine II the longest,

Table 1.—Extended (continued).

							Charon trebax new species	*Charon gervaisi* new species	
NTM Paratype ♀	WAM 96/1603 Paratype ♀	NTM Paratype ♀	NTM Paratype ♀	NTM Paratype ♀	NTM ♀ (exuvium)	NTM Juvenile ♀	QM S 105078 Holotype ♀	WAM 96/1601 Holotype ♀	QM S17225 Paratype ♀
12.40	12.45	12.50	15.05	12.56	11.60	6.20	8.50	11.00	10.80
1.55	1.63	1.70	1.98	2.22	1.60	1.20	1.38	1.50	1.60
13.67	14.88	14.00	17.21	14.47	12.20	5.70	8.10	11.00	10.90
4.88	5.06	5.50	6.42	5.31	4.50	2.80	3.50	4.50	4.20
2.60	2.66	2.80	2.82	2.94	2.00	1.50	2.30	2.00	3.00
10.80	10.98	11.30	11.46	12.40	10.50	5.50	7.60	10.40	10.30
1.46	1.62	1.70	1.92	1.78	1.40	0.80	1.36	1.55	1.50
13.45	14.60	16.22	16.47	13.51	12.00	6.10	8.30	11.00	11.80
4.13	4.39	4.40	5.34	4.44	3.90	2.50	3.00	4.40	3.50
2.67	2.66	3.10	2.93	2.81	2.10	1.50	2.21	3.00	3.00
25	26	26	25	25	27	—			
1	1	1	1	1	1	—			
44	43	43	44	44	44	—	25	26	26
1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	44	44	47
1	1	1	1	1	1	1	1	1	1
4	4	4	4	4	4	4	1	1	1
1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	4	4	4
1	1	1	1	1	1	1	1	1	1
							1	1	1
4	4	4	4	4	4	4	1	1	1
4	4	4	4	4	4	4	4	4	4
1	1	1	1	1	1	1	3	4	4
1	1	1	1	1	1	1	1	1	1
							1	1	1
4	4	4	4	4	4	4	4	4	4

with others arranged II > III > IV > I; antero-ventral margin with 5 major spines and 24 smaller spines, major spine III the longest, with others arranged III > II > I; mt IV > V. Tibia with 3 spines on the antero-dorsal margin, with I being the longest, with others similar size; antero-ventral margin with 3 spines, arranged I > III > II. Tarsus without spines, not divided. Legs: leg I with 25 tibial and 44 tarsal segments. Basitibia II and III with 1 segment. Basitibia IV with 4 segments; first 3 without trichobothria, fourth segment with 1 trichobothrium (0.39). Distitibia IV with 26 trichobothria (Fig. 4): bf (0.17), bc (0.32), sbf

(0.35), stf (0.50), sbc (0.55), sf_1 (0.80). Tarsi II, III and IV with 4 segments. Sternum: tripartite; anterior section only slightly expanded basally. Genitalia: with paired, posteriorly directed projections (Fig. 5).

Paratype female: (NTM). Carapace, pedipalps, leg I, patellae II, III, IV, basitibia-tarsus II, III, IV all reddish-brown. Abdomen and femora II, III, IV are a lighter orange-brown. Carapace: anterior margin straight, with 9 fine setae. Sulcus distinct surrounded by raised areas on carapace separated by radiating sulci. Median and lateral eyes lightly reduced in size. Median ocular tubercle darker than remainder of carapace, with eyes directed laterally. Carapace with numerous fine tubercles, many with small, acicular setae. Chelicera: hand with 4 teeth on antero-lateral margin, most basal tooth distally incised, 1 proximal tooth on retro-lateral margin. Movable finger with 6 small basal teeth. Pedipalps: long and slender (Figs. 17, 18). Trochanter with 6 spines on antero-dorsal margin, 9 spines on antero-ventral margin, and 3 spines on latero-ventral margin. Femur with 7 major spines and 18 smaller spines on antero-dorsal margin, major spine I the longest with others arranged II > VII > III > VI > V > IV; antero-ventral margin with 6 major spines and 18 smaller spines; major spine VI longest, with others arranged I > III > V > II > IV. Patella with 10 major spines and 13 smaller spines on antero-dorsal margin; major spine VIII the longest with others arranged V > III > IX > II > X> VII > VI > IV > I; antero-ventral margin with 5 major spines and 22 smaller spines, major spine IV the longest with others arranged III > II > I > V. Tibia with 2 major spines on antero-dorsal margin, with spine I the largest; antero-ventral margin with 4 spines, arranged I > IV > III > II. Tarsus without spines, not divided. Legs: leg I with 26 tibial and 44 tarsal segments. Basitibia II and III with 1 segment. Basitibia IV with 4 segments; first three without trichobothria, fourth segment with 1 trichobothrium (0.26). Distitibia IV with 26 trichobothria: bf (0.14), bc (0.25), sbf (0.30), stf (0.50), sbc (0.60), sf_1 (0.80). Tarsi II, III and IV with 4 segments. Sternum: tripartite; anterior section only slightly expanded basally. Genitalia (Fig. 6): gonopods simple, covered with numerous small pores, distally invaginated; posterior margin of sternite I sinuate; sternite II with ventral sac covers.

Remarks.—*Charon oenpelli* has only been found in sandstone caverns situated near Oenpelli, Arnhem Land, and possesses some troglophilic tendencies such as attenuate pedipalps, reduced median and lateral eyes, and pale coloration (Morris (1996), published a photograph of this species). These caves are also inhabited by a recently described scorpion, *Liocheles extensa* Locket, which also occurs outside of the cave systems in nearby woodland (Locket 1995, 1997).

Charon trebax new species
(Figs. 7–11, 17, 18; Table 1)

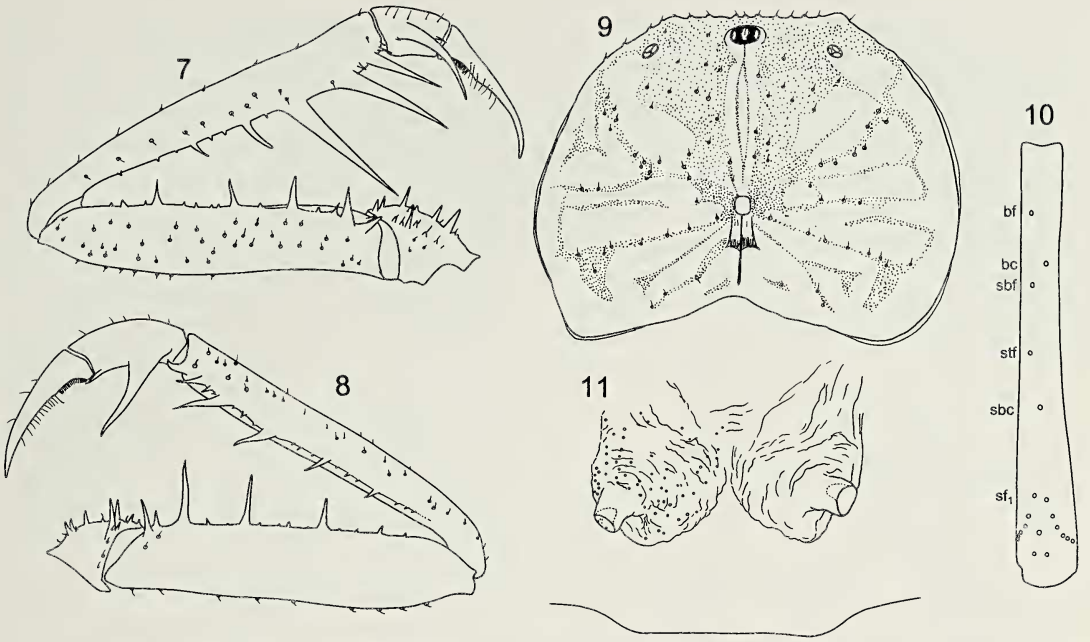
Types.—Holotype female from Cromarty, Emmett Creek, Queensland, Australia, 19°28′S, 147°03′E, found under rock, near dirt road going "off to right" between Emmett and McKenzie Creeks, 31 July 1990 (J. & L. Ferguson) (QM S105078).

Etymology.—The occurrence of this species in the Townsville region has been known for some time (G.B. Monteith pers. comm.), but specimens have previously not been captured. This elusiveness is reflected in the specific epithet (*trebax* Latin, cunning, crafty).

Diagnosis.—*Charon trebax* differs from other species of *Charon* by the following combination of characters: basitibia III with 1 segment; basitibia IV with 3 segments; distitibia IV with 20 trichobothria.

This species is easily distinguished from other *Charon* species by several character states, including the presence of only 3 segments in basitibia IV and only 20 trichobothria on distitibia IV (Fig. 10).

Description.—*Holotype female:* Carapace brownish-orange. Pedipalps reddish-brown. Leg I, patellae-tarsi II, III, IV and abdomen brownish-yellow. Femora II, III, IV with 4 brown bands and 3 yellow bands. Carapace (Fig. 9): anterior margin straight, with 9 fine setae. Sulcus distinct surrounded by raised areas on carapace separated by radiating sulci. Median and lateral eyes well-developed. Median ocular tubercle darker than remainder of carapace, with eyes directed laterally. Carapace with numerous fine tubercles, many with small, acicular setae. Chelicera: hand with 4 teeth on antero-lateral margin, most basal tooth distally incised, 1 proximal tooth on retro-lateral margin. Movable finger with 4



Figures 7–11.—***Charon trebax*** new species, female holotype. 7, Left pedipalp, dorsal; 8, Left pedipalp, ventral; 9, Carapace; 10, Left distitibia IV; 11, Genitalia, dorsal (pores omitted on one side).

small basal teeth. Pedipalps (Figs. 7-8): moderately stout (Figs. 17, 18). Trochanter with 8 spines on antero-dorsal margin, 4 spines on antero-ventral margin, and 4 spines on latero-ventral margin. Femur with 5 major spines and 11 smaller spines on antero-dorsal margin, major spine II the longest with others arranged III > VI > I > V; antero-ventral margin with 4 major spines and 10 smaller spines; major spine II longest, with others arranged III > V > I. Patella with 6 major spines and 9 smaller spines on antero-dorsal margin; major spine III the longest with others arranged IV > V > II > VI > I; antero-ventral margin with 6 major spines and 13 smaller spines, major spine IV the longest with others arranged III > II > VI > VI > I. Tibia with 3 major spines on antero-dorsal margin, with spine I the largest and spines II and III of the same length; antero-ventral margin with 2 spines, with spine I the largest. Tarsus without spines, not divided. Legs: leg I with 25 tibial and 44 tarsal segments. Basitibia II and III with 1 segment. Basitibia IV with 3 segments; first two without trichobothria, third segment with 1 trichobothrium (0.50). Distitibia IV with 20 trichobothria (Fig. 10): bf (0.16), bc (0.27), sbf (0.32), stf (0.47), sbc (0.59), sf_1 (0.79). Tarsi II, III and IV with 4 segments. Sternum: tripartite; anterior section only slightly expanded basally. Genitalia (Fig. 11): gonopods simple, covered with few small pores, distally invaginated; posterior margin of sternite I sinuate; sternite II with ventral sac covers.

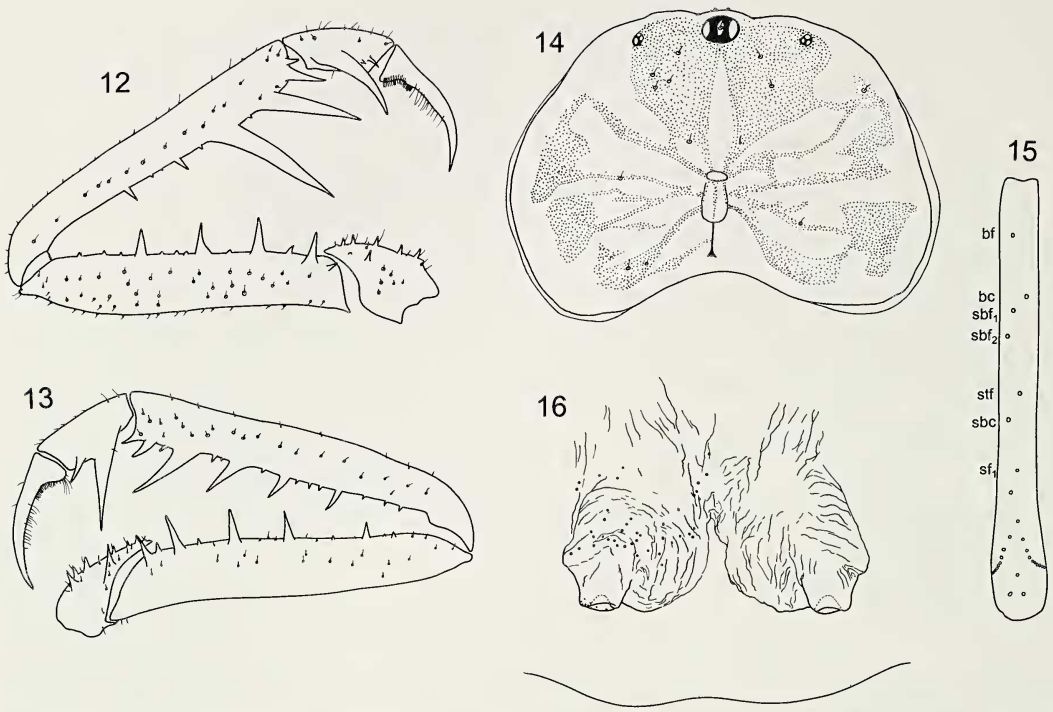
Remarks.—*Charon trebax* is only known from a single locality near Townsville, Queensland.

Charon gervaisi new species
(Figs. 12–18; Table 1)

Types.—Holotype female from Boat Club, Settlement, Christmas Island, Australia [10°25′S, 105°40′E], in wood pile, 10 February 1991 (H. Yorkstan) (WAM 96/1601). Paratype: 1♀ from Christmas Island, 28 February-6 March 1980 (J. Covacevich, H. Heatwole) (QM S17225).

Etymology.—This species is named for Paul Gervais who described the first species attributed to the genus *Charon*.

Diagnosis.—*Charon gervaisi* differs from other species of *Charon* by the following combination of characters: basitibia III with 1 segment; basitibia IV with 4 segments; distitibia IV with 30 trichobothria, including an extra sbf trichobothrium; carapace with very



Figures 12–16.—***Charon gervaisi*** new species, female holotype. 12, Left pedipalp, dorsal; 13, Left pedipalp, ventral; 14, Carapace; 15, Left distitibia IV; 16, Genitalia, dorsal (pores omitted on one side).

few seta-bearing tubercles; female gonopods with very few pores.

The extra trichobothrium in the sbf series (Fig. 15) is a diagnostic feature of this species, and is found in both legs in both of the specimens listed above. Numerous other characters such as the reduced number of seta bearing tubercles on the carapace and the reduced number of pores on the female gonopods are also diagnostic.

Description.—*Holotype female:* Pedipalps: trochanter dark brown. Tibia and tarsus dark reddish-brown. Patella and femur brown and orange bands. Chelicera dark reddish-brown. Carapace, leg I and patellae II, III and IV reddish-brown. Abdomen, basitibia-tarsus II, III,

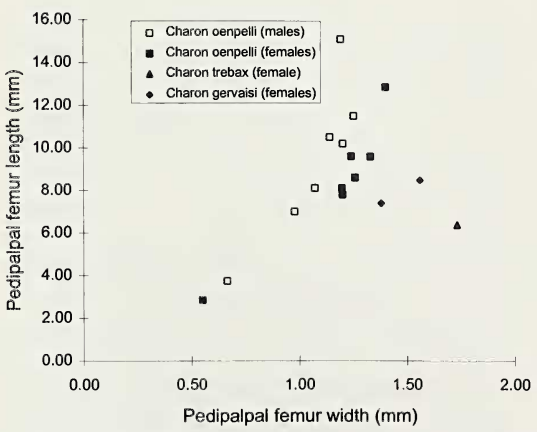


Figure 17.—Pedipalpal femur length vs. width in three Australian species of *Charon*.

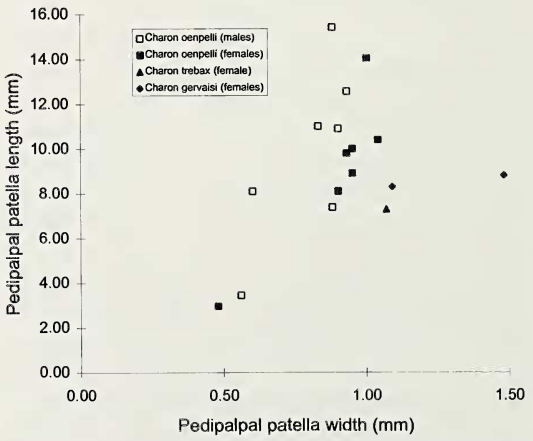


Figure 18.—Pedipalpal patella length vs. width in three Australian species of *Charon*.

IV and IV light brown. Femora II, III and IV with 4 brown bands and 3 yellow bands. Carapace (Fig. 14): anterior margin straight with a medial lobe, with 9 fine setae. Sulcus distinct surrounded by raised areas on carapace separated by radiating sulci. Median and lateral eyes well-developed. Median ocular tubercle darker than remainder of carapace, with eyes directed laterally. Carapace with numerous fine tubercles, but only some with small, acicular setae. Chelicera: hand with 4 teeth on antero-lateral margin, most basal tooth distally incised, 1 proximal tooth on retro-lateral margin. Movable finger with 6 small basal teeth. Pedipalps (Figs. 12, 13): moderately stout (Figs. 17, 18). Trochanter with 5 spines on antero-dorsal margin, 7 spines on antero-ventral margin, and 3 spines on latero-ventral margin. Femur with 4 major spines and 10 smaller spines on antero-dorsal margin, major spine II the longest with others arranged I > III > IV; antero-ventral margin with 5 major spines and 12 smaller spines; major spine II longest, with others arranged III > IV > I > V. Patella with 6 major spines and 11 smaller spines on antero-dorsal margin; major spine III the longest with others arranged IV > V > II > VI > I; antero-ventral margin with 6 major spines and 10 smaller spines, major spine IV the longest with others arranged III > II > I > V > VI. Tibia with 3 major spines on antero-dorsal margin, with spine I the largest and spines II and III of the same length; antero-ventral margin with 2 spines, with spine I the largest. Tarsus without spines, not divided. Legs: leg I with 26 tibial and 44 tarsal segments. Basitibia II and with 1 segment. Basitibia IV with 4 segments; first three without trichobothria, fourth segment with 1 trichobothrium (0.37). Distitibia IV with 30 trichobothria (Fig. 15): bf (0.13), bc (0.27), sbf_1 (0.30), sbf_2 (0.36), sbc (0.49), stf (0.55), sc_1 (0.66). Tarsi II, III and IV with 4 segments. Sternum: tripartite; anterior section only slightly expanded basally. Genitalia (Fig. 16): gonopods simple, covered with few small pores, distally invaginated; posterior margin of sternite I sinuate; sternite II with ventral sac covers.

Remarks.—*Charon gervaisi* is presently known only from Christmas Island, although an Indonesian origin for the species is very likely, given that Christmas Island lies only some 360 km off the south coast of Java.

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